

## FEATURES

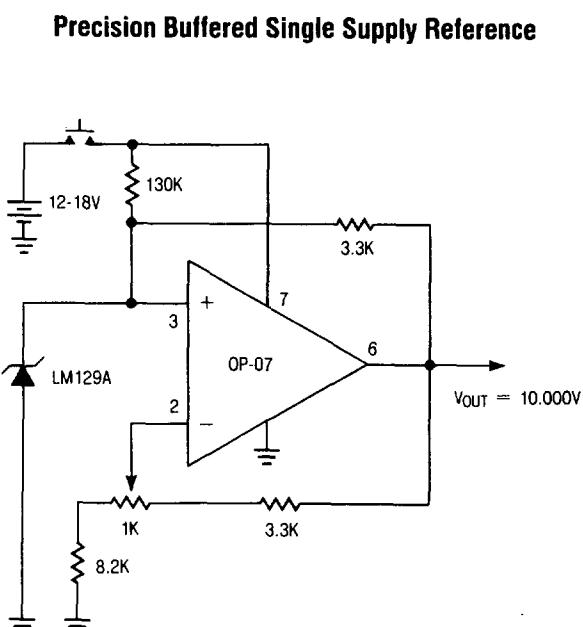
- *Guaranteed 150 $\mu$ V max. Offset Voltage*
- *Guaranteed 1.8 $\mu$ V/ $^{\circ}$ C max. Offset Voltage Drift with Temperature*
- *Excellent 2.0 $\mu$ V/Month max. Long Term Stability*
- *Guaranteed 0.65 $\mu$ Vp-p max. Noise*
- *Guaranteed 7nA max. Input Bias Current*

## APPLICATIONS

- Thermocouple Amplifiers
- Strain Gauge Amplifiers
- Low Level Signal Processing
- Medical Instrumentation

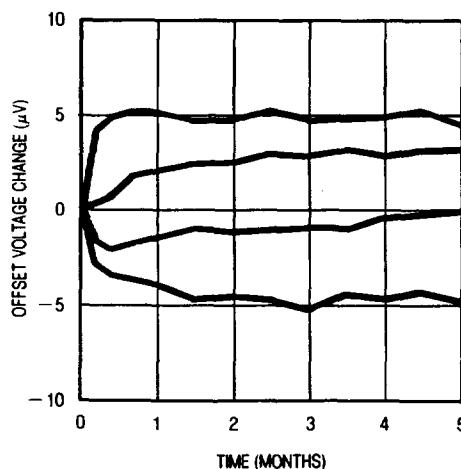
## DESCRIPTION

The OP-07 offers excellent performance in applications requiring low offset voltage, low drift with time and temperature and very low noise. Linear's OP-07 is interchangeable with many of the precision op amp device types. The OP-07 also offers a wide input voltage range, high common-mode rejection and low input bias current. These features result in optimum performance for small signal level and low frequency applications. Use of advanced design, processing and testing techniques make Linear's OP-07 a superior choice over similar products. A buffered reference application is shown below. For single op amp applications requiring higher performance in the SO package, see the LT1001CS8.

**2**


The OP-07 contributes less than 5% of the total drift with temperature, noise and long term drift of the reference application.

**Long Term Stability of Four Representative Units**



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage .....	$\pm 22V$
Differential Input Voltage .....	$\pm 30V$
Input Voltage Equal to Supply Voltage	
Output Short Circuit Duration .....	Indefinite
Operating Temperature Range .....	0°C to 70°C
Storage Temperature Range	
All Devices.....	-65°C to 150°C
Lead Temperature (Soldering, 10 sec.).....	300°C

## PACKAGE/ORDER INFORMATION

ORDER PART NUMBER
OP-07CS8
PART MARKING
OP07CS8

TOP VIEW

S8 PACKAGE  
PLASTIC SO

ELECTRICAL CHARACTERISTICS  $V_S = \pm 15V, T_A = 25^\circ C$ , unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	MIN	OP-07CS8 TYP	MAX	UNITS
$V_{OS}$	Input Offset Voltage	(Note 1)		60	150	$\mu V$
$\Delta V_{OS}$ $\Delta$ Time	Long Term Input Offset Voltage Stability	(Notes 2 and 3)		0.4	2.0	$\mu V/\text{Month}$
$I_{OS}$	Input Offset Current			0.8	6.0	nA
$I_B$	Input Bias Current			$\pm 1.8$	$\pm 7.0$	nA
$e_n$	Input Noise Voltage	0.1Hz to 10Hz (Note 2)		0.35	0.65	$\mu V_{p-p}$
	Input Noise Voltage Density	$f_0 = 10\text{Hz}$ $f_0 = 100\text{Hz}$ (Note 2) $f_0 = 1000\text{Hz}$		10.5 10.2 9.8	20.0 13.5 11.5	$nV/\sqrt{\text{Hz}}$
	Input Noise Current	0.1Hz to 10Hz (Note 2)		15	35	pAp-p
	Input Noise Current Density	$f_0 = 10\text{Hz}$ $f_0 = 100\text{Hz}$ (Note 2) $f_0 = 1000\text{Hz}$		0.32 0.15 0.13	0.90 0.27 0.18	$pA/\sqrt{\text{Hz}}$
	Input Resistance Differential Mode	(Note 4)	8	33		MΩ
	Input Resistance Common-Mode			120		GΩ
	Input Voltage Range		$\pm 13.0$	$\pm 14.0$		V
CMRR	Common-Mode Rejection Ratio	$V_{CM} = \pm 13V$	100	120		dB
PSRR	Power Supply Rejection Ratio	$V_S = \pm 3V$ to $\pm 18V$	90	104		dB
$A_{VOL}$	Large Signal Voltage Gain	$R_L = 2k\Omega, V_O = \pm 10V$ $R_L = 500\Omega, V_O = \pm 0.5V$ $V_S = \pm 3V$ (Note 4)	120 100	400 400		V/mV
	Maximum Output Voltage Swing	$R_L = 10k\Omega$ $R_L \geq 2k\Omega$ $R_L \geq 1k\Omega$		$\pm 12.5$ $\pm 11.5$ $\pm 10.5$	$\pm 13.0$ $\pm 12.8$ $\pm 12.0$	V
	Slewing Rate	$R_L \geq 2k\Omega$ (Note 2)		0.1	0.25	$V/\mu s$
GBW	Closed Loop Bandwidth	$A_{VOL} = +1$ (Note 2)	0.4	0.6		MHz
$Z_o$	Open Loop Output Impedance	$V_O = 0, I_O = 0, f = 10\text{Hz}$		60		Ω
$P_d$	Power Dissipation	$V_S = \pm 15V$ $V_S = \pm 3V$		80 4	150 8	mW
	Offset Adjustment Range	Null Pot = $20k\Omega$		$\pm 4$		mV

**ELECTRICAL CHARACTERISTICS**  $V_S = \pm 15V$ ,  $0^\circ C \leq T_A \leq 70^\circ C$ , unless otherwise noted.

SYMBOL	PARAMETER	CONDITIONS	OP-07CS8			
			MIN	TYP	MAX	UNITS
$V_{OS}$	Input Offset Voltage		●	85	250	$\mu V$
$\Delta V_{OS}$	Average Input Offset Voltage Drift		●	0.5	1.8	$\mu V/\text{°C}$
$\Delta T_{\text{Temp}}$	Without External Trim		●	0.4	1.6	$\mu V/\text{°C}$
	With External Trim	Null Pot = $20k\Omega$ (Note 2)				
$I_{OS}$	Input Offset Current		●	1.6	8.0	nA
$\Delta I_{OS}$	Average Input Offset Current Drift	(Note 2)	●	12	50	pA/ $^\circ C$
$\Delta T_{\text{Temp}}$						
$I_B$	Input Bias Current		●	$\pm 2.2$	$\pm 9.0$	nA
$\Delta I_B$	Average Input Bias Current Drift	(Note 2)	●	18	50	pA/ $^\circ C$
$\Delta T_{\text{Temp}}$						
	Input Voltage Range		●	$\pm 13.0$	$\pm 13.5$	V
CMRR	Common-Mode Rejection Ratio	$V_{CM} = \pm 13V$	●	97	120	dB
PSRR	Power Supply Rejection Ratio	$V_S = \pm 3V$ to $\pm 18V$	●	86	100	dB
$A_{VOL}$	Large Signal Voltage Gain	$R_L \geq 2k\Omega$ , $V_o = \pm 10V$	●	100	400	V/mV
$V_{OUT}$	Output Voltage Swing	$R_L \geq 2k\Omega$	●	$\pm 11.0$	$\pm 12.6$	V

The ● denotes specifications which apply over the full operating temperature range.

**Note 1:** Offset voltage is measured with high speed test equipment, approximately 1 second after power is applied.

**Note 2:** This parameter is tested on a sample basis only.

**Note 3:** Long Term Input Offset Voltage Stability refers to the averaged trend line of  $V_{OS}$  versus Time over extended periods after the first 30 days of operation. Excluding the initial hour of operation, changes in  $V_{OS}$  during the first 30 operating days are typically  $2.5\mu V$ .

**Note 4:** This parameter is guaranteed by design.